

Six Sigma in Communities of Care: Improved Care Via Institutionalised Genius

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Merciful – Not Mercenary: Bottom Lines and Six Sigma

Culture. *definition:* the way we do things around here.

Ours is an increasingly complex world – or at the least its inherent complexity is made ever more apparent by burgeoning woes that span societal, environmental, technological and economic realms. The healthcare community interacts deeply with each of these areas and the legitimacy of this claim is assumed *prima facie*.

So we agree, even if not wholly so, that our woes are daunting ones, solutions to which will require intelligent and coordinated human desire and effort, enabled by effectively deployed superior approaches that produce superior results in vitally important areas. Significant contributions to these solutions can and must come from the medical and healthcare arenas and given the rapidity with which our woes are encircling us, these contributions must be put propitiously into play.

That is precisely where Six Sigma comes into play: rapid development and deployment of breakthrough solutions in areas of critical need. Many of the methods of Six Sigma will be familiar to the reader, for they are statistical ones long in use within the medical and biological communities or management and planning ones that are in vogue in environments where teamwork and breakthrough thinking are valued.

If this is so, then the question begs: “what is new about Six Sigma?” It is its organization and notorious bottom-line focus – and some very high profile success stories – that have put it in the spotlight. As such, the goals herein are to familiarize the reader with the basic terminology and approach of Six Sigma and point to some successful applications of Six Sigma. While use of the term *bottom-line* brings to mind the most

common one that is, financial results, business has more-and-more begun to recognize multiple bottom-lines including, for example, ones related to society and the natural environment. Six Sigma is an approach that can be of value in development of solutions that jointly optimise multiple bottom lines – a critical characteristic given the tension between rapidly escalating healthcare costs and the historic roles of the medical and healthcare communities as relate to *mercy* and that are consistent with – for example – the name by which Clara Barton was often called: the *Angel of the Battlefield*. It is unfortunate that these communities are now seen by many not as *merciful*, but as *mercenary* and perhaps nowhere moreso than in the United States. Intelligently applied, Six Sigma can assist in a return to the mission of mercy in these communities because at a very fundamental level, Six Sigma is about changing an organisation’s culture, about changing the way things are done.

These approaches require commitment to stewardship of economic, environmental, technological and human resources. Effectively this is conscious election of service over self-interest where *profit* is construed as *residue* – that is, profit is that which remains after all obligations are fulfilled. The concept behind this approach is well-captured by *kyosei*, a Japanese term often translated as “living and working for the common good”. This is an approach that can be readily embraced by the medical and healthcare communities and, indeed, may provide an apt description of the *Six Sigma culture* as it should manifest in these communities.

Nexus: TQM and Business Excellence

In these early years of the 21st Century *Total Quality Management* (TQM) is generally more familiar than *Six Sigma* and this may be particularly so in the medical and healthcare communities in which rigorous application of quality methodologies is widespread and where America's Baldrige National Quality Award Program acknowledges the importance of quality in healthcare by having a distinct healthcare category of the Award. While many definitions of TQM are available, herein it is taken to mean: *satisfying customer needs and wants at lowest possible cost through extensive involvement of the organization's human resource*. Involvement of the human resource is perhaps nowhere perceived as more important than in the medical and healthcare communities.

It is of import to note that the Baldrige Award and its global cousins such as the European Quality Award, Australian Quality Award, Canada Excellence Award and others are based on *excellence* models, where – depending on who is discussing these models – the words *business*, *performance*, or *organizational* may be used to modify *excellence*. One widely used definition of such excellence – which will henceforth be called *business excellence* – is provided below.

Business Excellence is an overall way of working that balances stakeholder interests and increases the likelihood of sustainable competitive advantage and hence long-term organizational success through operational, customer-related, financial, and marketplace performance excellence (Edgeman, Dahlgaard, Dahlgaard and Scherer, 1999).

The primary purpose of such models and their criteria is the regular, rigorous, and systematic review of an organizations' approaches, their deployment, and results thereof for the purposes of determining the organizations' strengths, weaknesses and areas where resources should be focused so that that organizational performance can be strengthened. This process is referred to as *self-assessment*. Conti (1997) provides an outstanding treatise on self-assessment.

In the context of this discussion then, TQM is an enabler of business excellence. Similarly, we will herein regard Six Sigma as an enabler of business excellence and we will now turn the discussion in that direction. Further discussion of the relation of business excellence, Six Sigma and TQM can be found in Klefsjö, Wiklund and Edgeman (2001).

Tae Kwon Do and Six Sigma

Early on "quality" was the domain of *master* craftsman or artisans whose services were highly sought after by society's elite. Often such *masters* commanded both great respect and compensation and to this day the work of many past masters is regarded as benchmark. These *masters* commonly had *apprentices* or *disciples* to whom they would impart their knowledge and experience, model their craft and reveal their "secrets". Occasionally an apprentice was so exceptionally skilled and sufficiently innovative as to also gain acknowledgement as a master. Herein are principles also made use of by Six Sigma: successful development and application of knowledge and skills and effective communication thereof: principles vital to one popular characterisation of *success*: there is no success without a successor.

On an increasingly familiar level one can point to the tradition of masters and apprentices in martial arts such as *tae kwon do* where the masters are blackbelts and the path to mastery is paved by expertise, experience, accomplishment, self-control, patience and wisdom. Along the road there are many travellers – most of whom are not yet blackbelts and may never become so – but whose point on the journey is characterised by belts of various colors where the specific colors indicate progress along the path. Even among blackbelts there are distinctions marked by *degrees* where higher degrees denote further progress along the path.

This analogy and some of its terminology are applicable in Six Sigma. The "apprentices" of Six Sigma are called *Greenbelts* and they apply Six Sigma's structured problem-solving approach only periodically and then under the direction of one more skilled and more experienced in Six Sigma, whose fulltime activity is that of *Six Sigma*

Blackbelt. A Six Sigma Blackbelt is generally overseen by one with even more mastery and experience, called a *Six Sigma Master Blackbelt* who oversees several Blackbelts. Some organizations, including GE, have begun to require completion of the Greenbelt within a designated period of time as a condition of continued employment. Blackbelts and Master Blackbelts generally command great respect in the organisation and with that respect, higher compensation levels – a factor that has made retention of such individuals difficult in light of competition for their skills and for the promise of results that characterise Blackbelt efforts.

Knowledge and Its Discovery Through Six Sigma's DMAIC Approach

Like many organizations, those making use of Six Sigma typically have exceptional human capital. Not all organizations peopled by exceptional personnel achieve excellent results, however. What sets Six Sigma organizations apart from others is application of a structured knowledge-acquisition / problem-solving approach known as DMAIC that creates synergy between genius and quality that is characterized by superior ideas proved to be so by superior results in areas of strategic import. Included among those results in Six Sigma organizations is superior financial performance. That this is central to Six Sigma can be verified by examination of quality within the context of the value proposition wherein Six Sigma regards quality as a state in which value entitlement is realized for the customer and provider in all aspects of the business relationship and is highest when costs are at their absolute lowest for producer and consumer alike. Six Sigma provides maximum value to organizations in the form of increased profits and maximum value to the customer in the forms of high product and service quality at the lowest possible cost (Harry and Schroeder, 2000).

Effectively, DMAIC is a highly data-driven, fact-based application of the scientific method of inquiry that emphasizes discernment and implementation of the so-called “voice of the customer” (VOC) as related to processes, products and services that create value both for the producer and the consumer. Given Six Sigma's core value for data-driven decision-making, it

should not surprise the reader to learn that exceptionally effective methods for discerning the VOC exist. This critical effort is key to DMAIC's first phase – the **Define** phase – with other steps including problem definition and development of a charter for the Six Sigma team. Listed sequentially, the remaining DMAIC phases are **Measure**, **Analyze**, **Improve**, and **Control**. Applied systematically and strategically DMAIC produces bottom-line results superior to those achieved through other approaches.

In *process improvement* applications of Six Sigma the focus is trained on identification and implementation of targeted solutions. In such a context DMAIC is applied as follows:

- **Define** the problem and customer requirements.
- **Measure** defect rates and document the process in its current incarnation.
- **Analyze** process data and determine the capability of the process.
- **Improve** the process and remove defect causes.
- **Control** process performance and ensure that defects do not recur.

In contrast, *applications of Six Sigma* that focus on the design or redesign of products and services and their enabling processes so that from the beginning customer needs and expectations are fulfilled are known as *Design for Six Sigma* or *DFSS*. The focal aim of DFSS is to create designs that are resource efficient, capable of exceptionally high yields, and are robust to process variations. This aim produces a recasting of DMAIC that can be aptly characterized as **Define-Measure-Analyze-Design-Verify** (DMADV) and described as follows.

- **Define** customer requirements and goals for the process, product or service.
- **Measure** and match performance to customer requirements.
- **Analyze** and assess the design for the process, product or service.
- **Design** and implement the array of new processes required for the new process, product or service.
- **Verify** results and maintain performance.

Tools and techniques used in various of these phases include process maps, Pareto charts, scatter diagrams, affinity diagrams, brainstorming, the nominal group technique, as well as more substantial quantitative approaches such as correlation analysis, design of experiments, and regression analysis (Pyzdek, 2001). In applying these tools focus is fanatically trained on knowledge acquisition, particularly as relates to optimal fulfilment of the VOC – that is, on win-win solutions that benefit both the producer and consumer.

Organizations Successfully Applying Six Sigma

The list of organizations employing Six Sigma is a rapidly growing one that spans financial institutions, manufacturing, and technology-driven firms. Examples of Six Sigma companies familiar to most readers include Motorola, GE, Honeywell / Allied Signal, Raytheon, Sun Microsystems, J.P. Morgan and American Express. Of course, corporations such as GE are highly diverse and hence the medical and healthcare communities are already touched since, for example, portions of these corporation such as GE's Annapolis, Maryland based medical division has a long and successful history of Six Sigma applications.

Citation of detailed case results is outside the scope of this paper so that closure will instead be reached by citing a few impressive financial results implementing Six Sigma and one example of a costly *failure to apply* Six Sigma (Harry and Schroeder, 2000). First consider GE – Six Sigma's "poster child" – where Six Sigma delivered more than \$300M and \$600M, respectively, to GE's 1997 and 1998 operating incomes. At Raytheon Six Sigma improved the cost of doing business by more than \$1B annually. Bob Galvin, former CEO of Six Sigma's progenitor, Motorola has cited many of the positive results of Six Sigma implementation – but estimates that *failure to implement* Six Sigma in its non-manufacturing sectors cost Motorola more than \$5B over a four-year period.

These examples provide two indications that the medical and healthcare communities would do well to heed. The first of these is that application

of Six Sigma has the potential for financial benefit to the applying institution while simultaneously yielding better quality care and increased customer satisfaction at lower cost. The second indication is that failure to apply Six Sigma may result in large, but likely unrecognized and hence unquantified losses.

Last, there is a stark marketplace reality that is no less in play in the medical and healthcare communities than in the manufacturing, technology or financial arenas: institutions failing to implement Six Sigma fail to maximize the value proposition and place themselves at a marketplace disadvantage. While this is less critical in non-competitive environments, the healthcare marketplace is an increasingly competitive one serving an increasingly informed populace – one in which every person is a potential customer.

And the final word? That implementation of Six Sigma in the medical and healthcare communities is the merciful thing to do.

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